Claims:

1. An apparatus for cleaving thin rods (3) of glass or quartz having a diameter below 1 mm, comprising:

- an arrangement defining two mutually–spaced clamping locations for holding a said rod extended between the two clamping locations,

- a rod cleaving blade (27), adapted to be brought into lateral contact with such a rod at a desired cleaving point between said two clamping locations, to achieve cleaving of said rod at said point,

- a body (28) carrying the blade,

- driving means (31, 33) adapted to act upon said body for causing a relatively steady movement of the blade towards said desired cleaving point while subjecting the blade to a relatively small-amplitude vibratory component of movement towards and away from said cleaving point superimposed to said relatively steady movement towards the cleaving point,

characterized in that said body (28) is of a material varying its length through application of electric and/or magnetic fields therein, that said driving means is adapted to achieve said movements of the blade by influencing said body electrically and/or magnetically for creating length variations of the material thereof, and that the driving means is adapted to make the body and by that the blade vibrate with a said relatively small-amplitude component having a frequency below 1 kHz towards and away from the cleaving point for cleaving a said rod.

2. An apparatus according to claim 1, **characterized** in that said driving means (33) is adapted to make the blade vibrate

with a frequency below 750 Hz, between 100 and 700 Hz or between 250 and 450 Hz.

3. An apparatus according to claim 1 or 2, **characterized** in that it is adapted to cleave optical fibres.

4. An apparatus according to any of claims 1-3, **characterized** in that it is adapted to cleave said rods having a diameter below 600 µm or below 300 µm and preferably between 50 and 200 µm.

5. An apparatus according to any of the preceding claims, **characterized** in that said material of the body (28) has piezo-electric properties, that said driving means (31, 33) is adapted to apply a relatively steadily varying direct voltage to said body for obtaining said relatively steady movement of the blade and an alternating voltage to said body for obtaining said relatively small-amplitude vibratory component of movement of the blade, and that the apparatus further comprises a control means (32) for controlling at least the magnitude of said relatively steadily varying direct voltage.

6. An apparatus according to any of claims 1-4, **characterized** in that the material of said body (28) has magneto-strictive properties, that said driving means is adapted to apply a relatively steadily varying magnetic field in said material for obtaining said relatively steady movement of the blade and an alternating magnetic field in the material of said body for obtaining said relatively small-amplitude vibratory component of movement of the blade, and that the apparatus further comprises a control means for controlling at least the magnitude of said relatively steadily varying magnetic field in said body.

7. An apparatus according to any of the preceding claims, **characterized** in that said driving means (31, 33) are adapted to move the blade so that said movements of the

blade take place along an arc-like path and the blade will hit the fibre in a direction making an angle with the fibre differing from 90° for cutting the fibre in this direction.

8. An apparatus according to any of the preceding claims, **characterized** in that the blade (27) is arranged on a free end (29) of a said body in the form of a strip-like stave (28) being fixed at the other end (30), and that said driving means (31, 33) is adapted to cause said movements through bending the strip-like stave towards said desired cleaving point of the rod so that said movements of the blade take place along an arc-like path and the blade will hit the fibre in a direction making an angle with the fibre differing from 90° for cutting the fibre in this direction.

9. An apparatus according to any of the preceding claims, **characterized** in that said arrangement comprises a first clamping means arranged to clamp said rod (3) in a first said clamping location, that said first clamping means has a first clamping member (22) with a clamp face (23) of substantially V-groove type, for receiving the rod in the groove (24), and a second clamping member (21) having a flat opposing clamp face (25) for retaining the rod in the groove, and that the first clamping member having the grooved clamp face is moveable towards and away from the second clamping member for clamping and releasing a said rod, respectively.

10. An apparatus according to claim 9, **characterized** in that said first clamping member (22) is received in a guide and removable from the apparatus by pushing or lifting it out of the guide for exchange.

11. An apparatus according to any of the preceding claims, **characterized** in that it comprises a second clamping means (1) arranged to clamp said rod in a second said clamping location, that the second clamping means is moveable in the longitudinal direction of a said rod extended between the two

clamping locations, that the apparatus comprises means (12) for moving the second clamping means in said longitudinal direction for extending a rod clamped by said arrangement for applying a longitudinal tension load to the rod (3), and that the second clamping means is adapted to clamp said rod in a second said clamping location belonging to the part of the cleaved rod intended for later use.

12. An apparatus according to claim 11, **characterized** in that said means (1) for moving said second clamping means (1) is adapted to automatically move the rod part clamped by said second clamping means away from the cleaving point upon cleaving of the rod as a consequence of said tension load applied therethrough.

13. An apparatus according to claim 12, **characterized** in that it further comprises means (13) for measuring said tension load and means (40) for influencing said moving means (12) for adjusting the tension load on the basis of information about the tension load from said measuring means.

14. An apparatus according to claim 13, **characterized** in that said adjusting means comprises a computer (40) communicating with the tension load measuring means (13) for adjusting said tension load to a value that may be set by the computer.

15. An apparatus according to any of the preceding claims, **characterized** in that said arrangement comprises a second clamping means (1) moveable in the longitudinal direction of a said rod extended between said two clamping locations, and that the apparatus comprises means (4, 12) for moving said second clamping means in said longitudinal direction and means (41) adapted to measure the position of said second clamping means in said longitudinal direction, and that said measuring means is adapted to communicate with a computer (40) adapted to control the movement of said sec-

ond clamping means with a high accuracy on the basis of information from said position measuring means.

16. An apparatus according to any of the preceding claims, **characterized** in that it further comprises at least one member (14) having at least one inclined surface and means (19) for moving said member laterally towards a rod (3) being clamped in only one of said two clamping locations before clamping it in the other clamping location with the inclined surface (17, 18) into abutment against the rod for influencing the rod by sliding thereof upon said surface for reaching the position desired for said other clamping location before clamping the rod in that location.

17. An apparatus according to claim 16, **characterized** in that it comprises one or more said members (14) having together at least two said inclined surfaces (17, 18), which are oppositely inclined with respect to a plane including said two clamping locations and adapted to be moved by said moving means (19) laterally towards said rod for moving the rod to a seat in an intersection between said two inclined surfaces (17, 18) as seen in the direction from one clamping location to the other.

18. An apparatus according to claim 16 or 17, **characterized** in that said inclined surface (17, 18) or surfaces is (are) designed for adjusting the height of a said rod (3) at said other clamping location before the latter is clamped there.

19. An apparatus according to any of the preceding claims, **characterized** in that it comprises means (35) adapted to enable adjustment of the blade (27) for controlling the position along the blade of the blade portion used for cleaving a said rod, so that this position may be changed for changing said blade portion when a previous blade portion has been worn out.

20. An apparatus according to any of the preceding claims, **characterized** in that it comprises means (37, 38) adapted to be arranged close to one end of a rod extended between the two clamping locations for drawing a waist rod portion away after said cleaving operation, that said driving means (31) is adapted to laterally apply a force through the blade (27) onto said waist rod portion (39) at the end thereof located at said cleaving point after cleaving the rod for influencing said waist rod portion to be released from the clamping arrangement when the latter opens for being drawn away through said means arranged at the free end of the waist rod portion.

21. A method of cleaving a thin rod of glass or quartz having a diameter below 1 mm, comprising the steps of:

supporting said rod (3) in a working position;

bringing about a relatively steady movement of a cleaving blade (27) towards a point of lateral contact with said rod,

superimposing on said relatively steady movement of the blade a relatively small-amplitude vibratory component of movement, said vibratory component being towards and away from the axis of the rod, **characterized** in that a said vibratory component of movement having a frequency below 1 kHz is applied to the blade.

22. A method according to claim 21, **characterized** in that it further comprises a step of clamping, prior to the supporting step, in which said rod (3) is clamped in two mutually-spaced clamping locations for holding the rod extended between these two clamping locations in said working position, and in which the clamping in a first clamping location is carried out by moving a first clamping member (22) with a clamp face (23) of substantially V-groove type, for receiving the rod in the groove (24), towards a second clamping member (21)

having a flat opposing clamp face (25) for retaining the rod in groove for clamping the rod.

23. A method according to claim 22, **characterized** in that it further comprises a step of adjusting the position of a rod (3) being clamped in only one of said two clamping locations before clamping it according to said clamping step in the other clamping location, in which at least one member (14) having at least one inclined surface (17, 18) is moved laterally towards said rod with the inclined surface into abutment against the rod for influencing the rod by sliding thereof upon said surface for reaching a position desired for said other clamping location.

24. A method according to claim 23, **characterized** in that in said adjusting step one or more said members (14) having together at least two said inclined surfaces (17, 18), which are oppositely inclined with respect to a plane including said two clamping locations, are moved laterally towards said rod (3) for moving the rod to a seat in an intersection between said two inclined surfaces as seen in the direction from one clamping location to the other.

25. A method according to any of the claims 21-24, **characterized** in that it further comprises a step, carried out prior to said supporting step, of clamping said rod (3) in two mutually-spaced clamping locations for holding the rod extended between these two clamping locations, that after this clamping step at least one of said two clamping locations is moved in the longitudinal direction of said clamped rod for increasing the distance to the other clamping location and by that applying a longitudinal tension load to the rod, and that said tension load is measured and the movement of the clamping locations apart is controlled on the basis of information about the tension load measured for adjusting the tension load.

26. A method according to any of the claims 21-25, **characterized** in that it comprises a step of clamping a said rod (3), carried out prior to said supporting step, and in which a said rod is clamped in two mutually-spaced clamping locations for holding the rod extended between these two clamping locations in said working position, that after said cleaving operation has been completed said blade (27) is moved into contact with a waist rod portion (39) resulting from said cleaving for applying a force onto said waist rod portion at the end thereof located at a point for said cleaving, and that a releasing of the clamping action in the clamping point of said waist rod portion is co-ordinated with a suction away of that portion promoted by said force applied through the blade on said end of the waist rod portion.

27. A method according to claim 26, **characterized** in that the clamping location belonging to the rod portion for later use is after the cleaving operation moved in the direction away from said cleaving point before the blade (27) is moved into contact with said end of the waist rod portion (39).

28. A computer program directly loadable into the internal memory of a computer, comprising software code portions for controlling the steps of any of claims 21-27 when said program is run on the computer.

29. A computer program according to claim 28, provided at least partially through a network as the Internet.

30. A computer readable medium, having a program recorded thereon, where the program is to make a computer control the steps of any of claims 21-27.